

The Barrens— Tennessee's Prairie Ecosystems

You Can Help!

We can ensure that barrens ecosystems will continue to be a part of Tennessee's natural beauty. Every citizen can help protect and restore these ecosystems. Every little bit counts! Here's how: Do not pick wildflowers. Remember to stay on trails to avoid trampling plants and animals. Support state and local habitat conservation and natural areas protection efforts. Learn more about fire's important role in ecosystem function. Continue to educate yourself and others about barrens ecosystems and the species they support. Use native wildflowers propagated by local nurseries for landscaping around your home. Take pride in and enjoy Tennessee's barrens ecosystems!



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What Are Barrens?

Tennessee's barrens ecosystems are a mosaic of open canopy woodlands with a grassy understory and areas of essentially treeless grassland. Various types of barrens are found, sparsely scattered from the Ridge and Valley Province to west Tennessee. They are best developed and most extensive on the Eastern Highland Rim, Western Highland Rim, and Pennyroyal Plain. Along the Kentucky border these areas were named prairies, or meadows of grass, by early French explorers. Early Anglo land surveyors named these savanna-like areas the barrens because of their relative bareness of trees.

The barrens ecosystems of Tennessee appear similar to the Midwestern tall-grass prairies but originated at a different time. One type of barren is closely associated with the cedar glade ecosystems. Barrens have deeper soil, less exposed bedrock, and more perennial grass cover than these neighboring cedar glade ecosystems.

Based on fossil pollen records, it is thought that the barrens became established near the end of the Hypsithermal period, a hot dry time

that occurred 4,000 to 8,000 years ago. The climate of the time was not favorable for forest growth and gave species typical of prairielike communities. The soils also played an important role in the development of the prairies.

The original soils were derived from limestone, which was then covered by a thin layer of wind-blown material, called "loess," that originated from rocks ground by glacial scouring. As water trickled through the top layer down to the limestone-derived clay below, moisture accumulated between the loess and the clay. Minerals in the water collected in cementlike layers to form the "hardpan soils." The hardpan soils of the Eastern Highland Rim kept soils saturated in the winter and droughty in the summer, which allowed the prairie plant community to form and inhibited tree growth. Without trees, fire spread easily on the flat landscape, with grasses providing fuel for the fires.

Since that time our climate has favored the development of forests, and the barrens have shrunk considerably. It is thought that the

remaining barrens were historically maintained by wildfires and the fires of Native Americans, which restricted the spread of trees and other woody plants.

Why are Barrens Ecosystems Important?

The barrens ecosystems represent a remnant of what was once probably a much larger ecosystem. The protection of remaining tracts of barrens and the restoration of areas historically occupied by these ecosystems offers the return of a now globally rare tall-grass communities. These ecosystems also offer us the opportunity to observe processes that are typical within the barrens, which constitute a living laboratory.

Barrens ecosystems provide habitats for a variety of beautiful wildflowers. Botanists and the general public flock to these small grasslands from May through June to view the spring colors of Indian paintbrush, wild blue false indigo, colic root, and others. Late summer and early fall provide another opportunity for wildflower enthusiasts as Southern prairie-dock; blazing star; sunflowers; yellow, pink, and purple asters; and blooming grasses decorate the landscape.

Rare and Unique Species Depend on Barrens Ecosystems

Barrens ecosystems support a remarkably diverse array of plants and animals. Species of the Midwestern tall-grass prairies, such as big bluestem, little bluestem, yellow Indian grass, and switchgrass, can be found here. Disjunct species typically found in the coastal plains of the Atlantic Ocean and Gulf of Mexico can also be found here. False asphodel and snowy orchids, are two species that occur at one site in the barrens of the Eastern Highland Rim and nowhere else in Tennessee. The prairie gentian and pale-purple coneflower each occur at only one site in Tennessee's barrens and are typically found in Midwestern tall-grass prairies.

Rare and declining plants and animals depend on the barrens. Recent decades have brought the decline of between 25 and 65 percent of grassland-dependent species of birds, such as grasshopper sparrows and prairie warblers. Amphibians, like the dusky gopher frog, will disappear from Tennessee if the barrens ecosystems continue to shrink. The

barrens ecosystems support more than 300 species and subspecies of plants, and Tennessee has listed more than 25 barrens-associated plants as endangered, threatened, or of special concern, such as Southern prairie-dock and swamp lousewort. Eggert's sunflower is federally threatened, and the endangered American chaffseed is believed to be extirpated from the state.

Threats to Barrens Ecosystems

Because barrens are often relatively flat, much of Tennessee's barrens have been converted to agriculture or have been covered by forests due to fire suppression. Hardpan soils critical to the survival of prairielike species have been broken up to improve agriculture. The use of fire by Native Americans was not continued by European settlers, and since 1945 state laws and the use of fences have prevented open range and woodland fires, allowing trees and other woody plants to spread further into the declining barrens. The introduction and wide-scale use of exotic species like cool-season fescue has taken over barrens, edging out native species. The digging of ditches and the resulting drainage has promoted further invasion of woody species into the grasslands. The development of residential housing and industrial facilities and the outright destruction of barrens by paving roads and establishing lawns have caused this rare ecosystem to decline further.

What's Being Done?

Efforts are being made in Tennessee to protect and restore the barrens ecosystems. Prescribed burning at selected sites is helping to reduce the spread of woody species into the barrens. Barrens restoration includes prescribed burning and herbicide treatments to eliminate exotic fescue. This restoration is being done cooperatively with the Tennessee Wildlife Resources Agency, the Tennessee Department of Agriculture's Division of Forestry, and the Tennessee Department of Environment and Conservation's Natural Heritage Division (under their Natural Areas Program). Also, Arnold Air Force Base is working with the U.S. Fish and Wildlife Service, The Nature Conservancy, and other partners to complete species inventories and test various management practices for restoring or maintaining barrens habitat.

An essential part of barrens restoration is land protection. State agencies and The Nature Conservancy are active in this area. One area in Tennessee that has been protected is May Prairie. May Prairie is a small area of less than 20 acres of barrens that was purchased by the state in 1975 as part of a larger tract. Tennessee's Natural Areas Preservation Act of 1971 protected the area now known as the May Prairie Designated State Natural Area. May Prairie was also registered as a National Natural Landmark by the National Park Service in 1981. Current efforts include linking isolated prairies and clearing young timber from former prairie areas.

Seeing is Believing!

Tennessee has many trails, parks, and natural areas where you can get a close-up view of wild plants and creatures and their habitats. Using the supplemental *Tennessee Wildlife Viewing Guide*, locate and visit a barrens ecosystem when the wildflowers are in bloom!

Eggert's Sunflower

(*Helianthus eggertii*)

You Can Help!

Tell a friend about Eggert's sunflower. Avoid picking wildflowers. Remember to stay on trails to avoid trampling unique plants. Learn about fire's important role in ecosystem function. Take pride in Tennessee's wildflowers!



Status

Eggert's sunflower was listed as threatened on June 23, 1997.

Description

Eggert's sunflower is a tall member of the aster family; it grows to about 8 feet in height. The plant has a blue-waxy coloration with whitish lower leaves. The plant's pointed leaves are 10 to 20 centimeters long. The flowers are large and yellow, and they bloom from early August through early October. The seeds are blackish or grayish and mottled. The extensive root system of this sunflower can live for several years; thus, the plant does not need to produce seeds every year to ensure its survival.

Habitat

Eggert's sunflower depends on the barrens ecosystems. It typically occurs on rolling to flat uplands and in areas that receive full sun or partial shade. There are 34 populations of this rare plant in Tennessee, Alabama, and Kentucky. Tennessee's populations occur within the barrens of the Highland Rim and Central Basin.

Role in the Ecosystem

The flowers and seeds of this plant are enjoyed by insects, such as bees, and birds. This plant is part of the diversity of life within barrens and adds to the health of the ecosystem. In addition, many wild species of sunflowers have been used to develop today's highly productive and disease resistant commercial sunflower crops. Scientists will continue to look to wild populations of plants to improve our commercial crops, so conservation of wild plant species is important.

Threats

Eggert's sunflower is threatened with habitat destruction. Residential, commercial, and industrial development and conversion to crop and pasture land continues to reduce the barrens of Tennessee. Fire suppression has allowed Eggert's sunflower to be threatened by the spread and succession of other plants into its habitat. Herbicide use along nearby roadways also poses a threat to this rare plant.

Recovery

The Tennessee Wildlife Resources Agency and the Tennessee Department of Environment and Conservation's Division of Forestry and their Natural Heritage Program are working together to restore Tennessee's barrens, using prescribed burning and other methods of restoration. Arnold Air Force Base is home to the state's largest population of Eggert's sunflower, and they are working with The Nature Conservancy to manage and protect this rare plant.